



Alaska Climate Research Center
Alaska State Climate Center

STATEWIDE CLIMATE SUMMARY OCTOBER 2021

IN THIS ISSUE

| | |
|------------------------------|--------|
| Monthly Highlights..... | pg. 2 |
| Statewide Temperatures..... | pg. 3 |
| Statewide Precipitation..... | pg. 5 |
| State of the Sea Ice..... | pg. 9 |
| Newsworthy Information..... | pg. 11 |



Alaska’s Statewide Climate Summary for October 2021 provides an overview of weather for the month based on data from selected weather stations throughout the state. “Departure from normal” refers to the climatological average over the 1991-2020 normal period. Here, we report on temperature, precipitation and drought conditions in the state, as well as the condition of the Arctic sea ice.

HIGHLIGHTS

Warmer October throughout the Interior and the North Slope and **colder than usual temperatures** across the West Coast and Panhandle.

The Aleutians, Kodiak, the Gulf Coast, and the Panhandle were directly affected by **strong cyclones** that developed over the Bering Sea and moved across the Gulf of Alaska.

Fairbanks and Gulkana **receive majority of monthly precipitation during one storm**, and Fairbanks **breaks daily snowfall records two days in a row**.

October 2021 sea ice extent was the **8th lowest in the satellite record** and the end of the month extent was **higher than any year since 2015**.

Temperature

Warmer than normal temperatures were recorded at first order stations across the Interior, the North Slope, and parts of the Cook Inlet, while colder than normal temperatures were recorded along the West Coast and Panhandle (Figure 1, Table 1). Daily mean temperatures (Figure 2) reveal that most stations experienced colder than normal temperatures at the start of the month, followed by a period of warmer temperatures. Temperatures at multiple locations shifted several times throughout the month, with episodes of warmer and colder than normal temperatures. However, warmer temperatures persisted at several Interior stations, with the highest temperatures occurring over October 30-31. A chinook wind event in the eastern Interior caused temperatures to rise late on the 30th and into the early morning hours of the 31st, with Fairbanks setting a new daily high temperature record just before midnight.

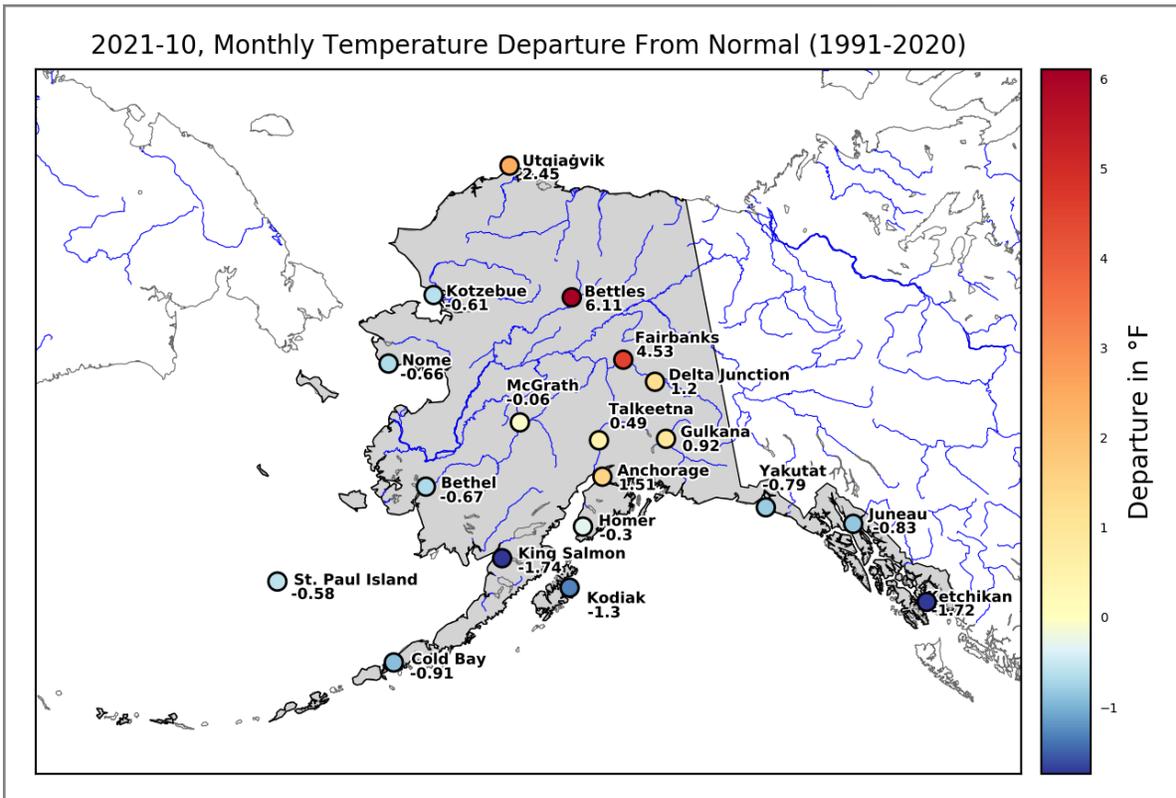


Figure 1. Monthly mean temperature departure from normal, October 2021, for selected stations around the state of Alaska. Temperature data for Kodiak are from the Kodiak WWTP station (USC00504991).

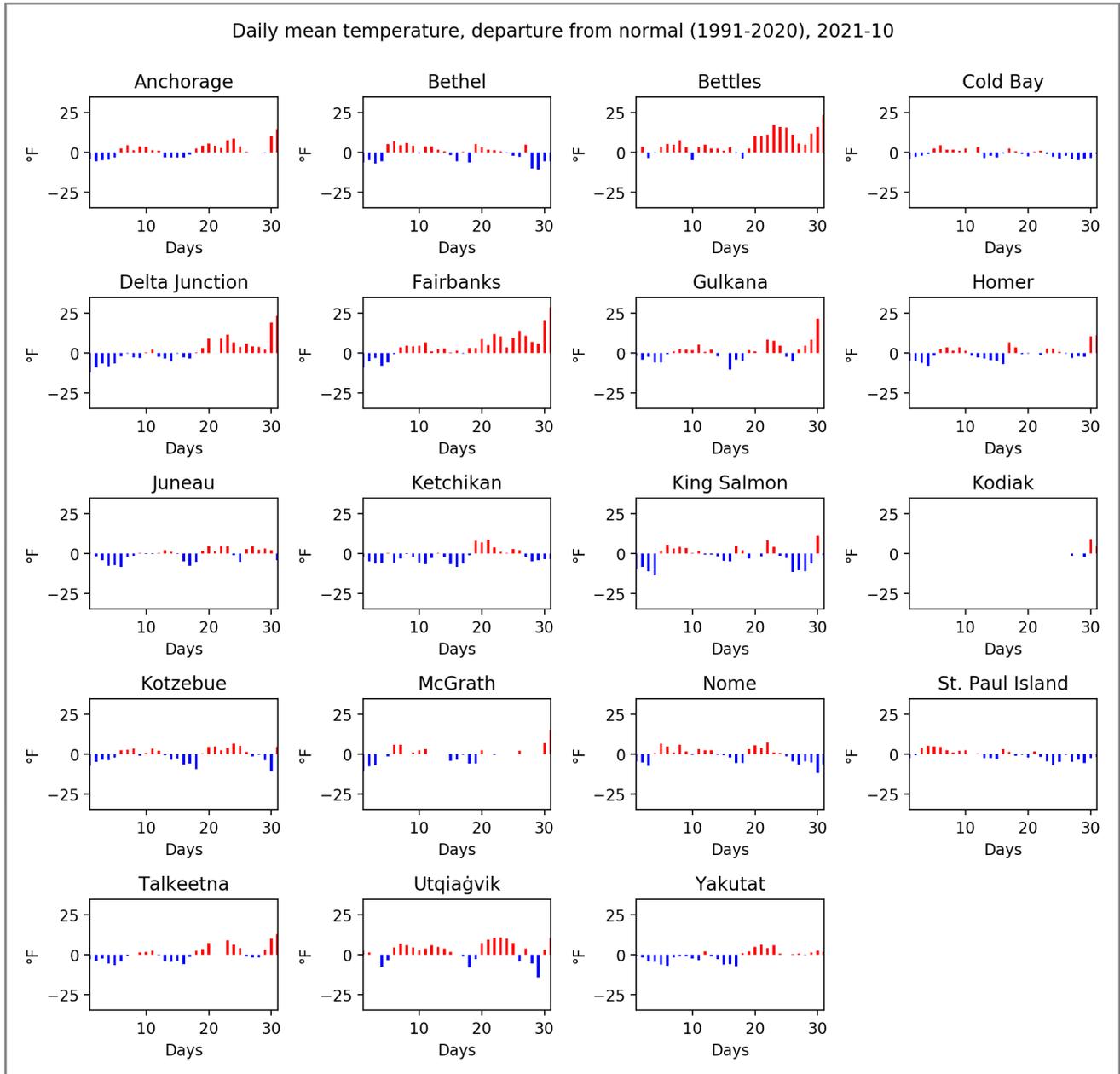


Figure 2. Daily mean temperature departures for each day in October 2021 at the selected stations.

| Station | Observed (°F) | Normal (°F) | Departure (°F) |
|-----------------|---------------|-------------|----------------|
| Anchorage | 37.9 | 36.3 | 1.5 |
| Bethel | 31.5 | 32.2 | -0.7 |
| Bettles | 27.5 | 21.4 | 6.1 |
| Cold Bay | 40.4 | 41.3 | -0.9 |
| Delta Junction | 27.8 | 26.5 | 1.2 |
| Fairbanks | 30.8 | 26.3 | 4.5 |
| Gulkana | 28.5 | 27.1 | 0.9 |
| Homer | 40.0 | 40.2 | -0.3 |
| Juneau | 41.4 | 42.2 | -0.8 |
| Ketchikan | 44.5 | 46.2 | -1.7 |
| King Salmon | 34.7 | 36.4 | -1.7 |
| Kotzebue | 26.3 | 26.9 | -0.6 |
| McGrath | 29.8 | 28.5 | -0.1 |
| Nome | 29.8 | 30.4 | -0.7 |
| St. Paul Island | 38.9 | 39.5 | -0.6 |
| Talkeetna | 34.7 | 34.2 | 0.5 |
| Utqiagvik | 23.7 | 21.2 | 2.5 |
| Yakutat | 41.1 | 41.9 | -0.8 |

Table 1. Mean monthly air temperature, normal (1991-2020) and departure for selected stations throughout the state, October 2021. Color-coded to Figure 1 (yellow-orange-red = warmer than usual; shades of blue = cooler than usual).

Precipitation

October was an active month for storms, with multiple storms bringing high winds and heavy precipitation to parts of Alaska. The month started with a snowfall event over the Interior, where Fairbanks broke daily precipitation and snowfall records two days in a row, and heavy rain and gusty winds across the central and southern Panhandle (Figure 3A). A few days later, a strong storm in the western Bering Sea containing the remnants of

Typhoon Mindulle approached the West Coast, bringing a mix of rain and snow into the central and northern Interior. Daily precipitation records were broken at Fairbanks and McGrath during this storm, with McGrath receiving more precipitation on October 7 (1.36 inches) than the 1991-2020 normal precipitation total for the entire month. Multiple low-pressure systems brought windy conditions and precipitation to the southwestern and southeastern coasts during the middle of the month, including one storm with hurricane force winds (Figure 3B). The month finished out with a major storm in the Gulf of Alaska, bringing heavy snowfall once again to the West Coast and the western Interior, and record rainfall to the eastern Kenai Peninsula and western Prince William Sound.

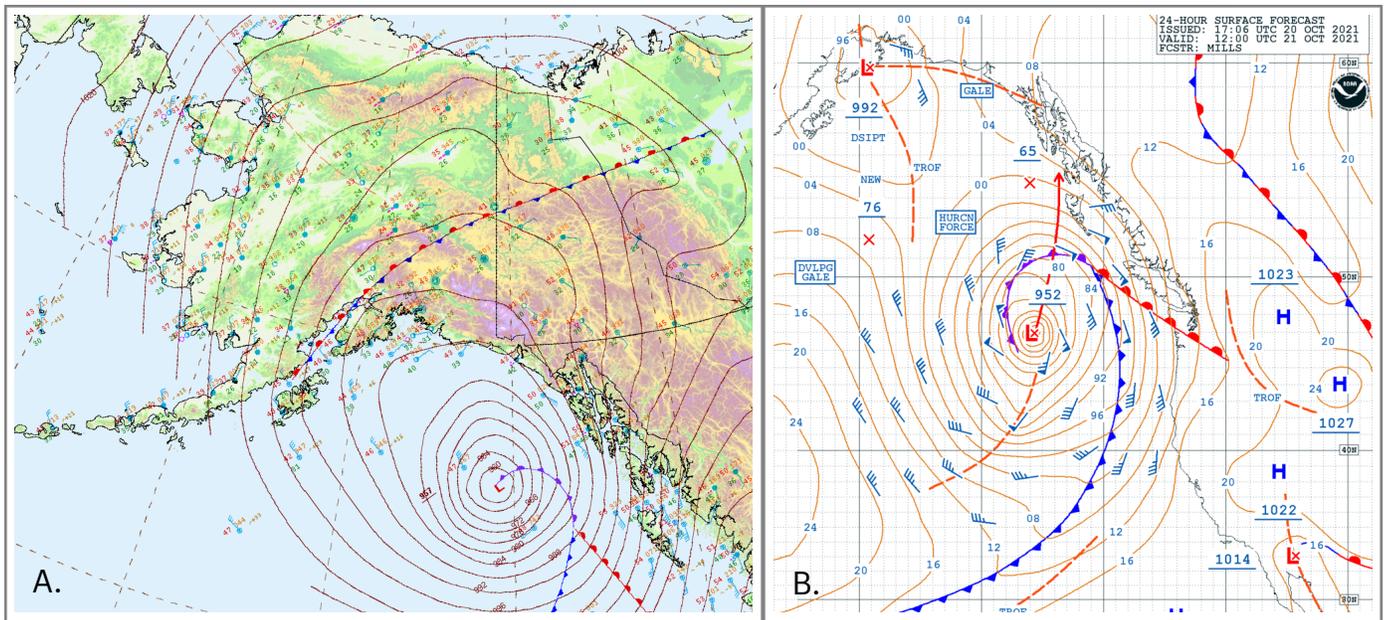


Figure 3. (A) NCEP surface analysis for 00 UTC October 2 and (B) NCEP OPC 24-hour surface forecast analysis for 12 UTC October 21.

Overall, most locations around the state reported near or above normal precipitation amounts, with the exception of the northwestern coast, the southeastern Interior, and the northern Panhandle (Figures 4 & 5, Table 2). Significantly greater than normal and near normal snowfall was observed at Bettles and Fairbanks, while Anchorage observed below normal snowfall and Juneau recorded no snowfall during the month (Table 3).

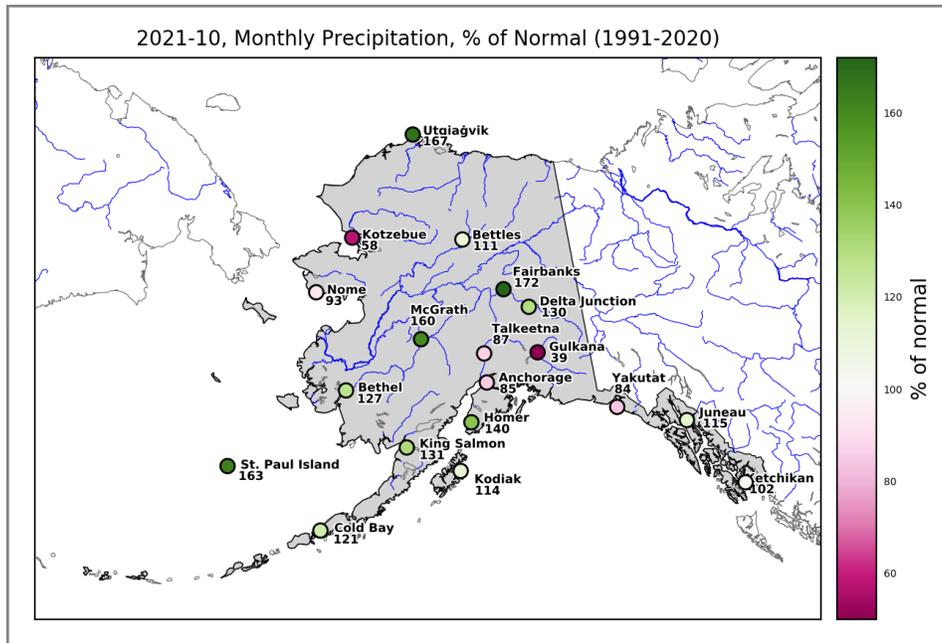


Figure 4. Monthly mean precipitation departure from normal (in percent), October 2021, for selected stations around the state of Alaska. Precipitation data for Kodiak are from the Kodiak WWTP station and data for Delta Junction are from the Granite Creek SNOTEL station.

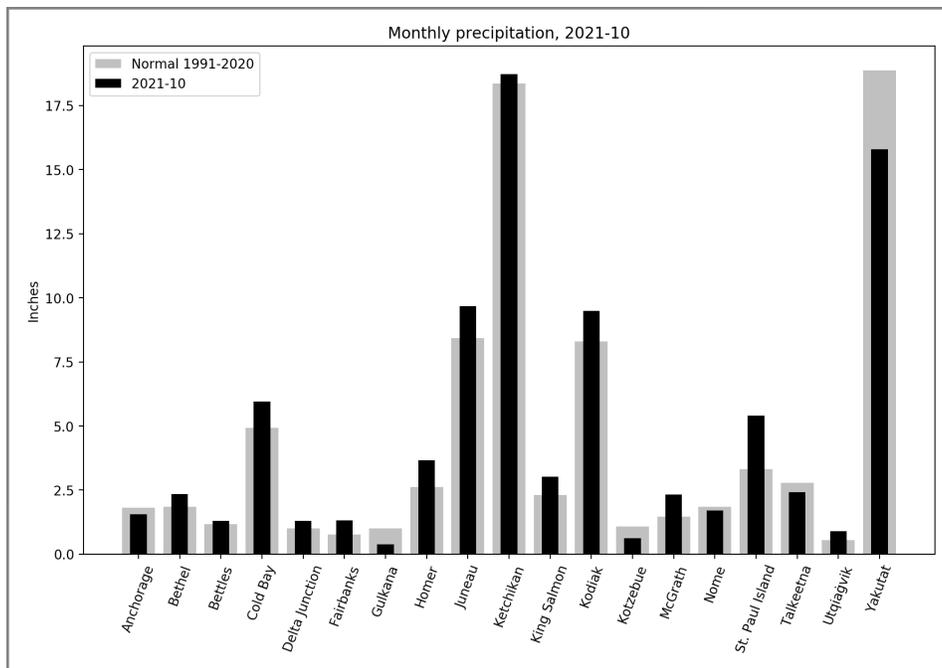


Figure 5. Monthly precipitation sums for October 2021 at the selected stations compared to the normal (1991-2020), in inches. Precipitation data for Kodiak are from the Kodiak WWTP station and data for Delta Junction are from the Granite Creek SNOTEL station.

| Station | Precipitation (in) | Normal (in) | % of Normal |
|-----------------|--------------------|-------------|-------------|
| Anchorage | 1.6 | 1.8 | 85.2 |
| Bethel | 2.3 | 1.8 | 127.2 |
| Bettles | 1.3 | 1.2 | 111.1 |
| Cold Bay | 6.0 | 4.9 | 120.9 |
| Fairbanks | 1.3 | 0.8 | 172.4 |
| Gulkana | 0.4 | 1.0 | 39.0 |
| Homer | 3.7 | 2.6 | 140.2 |
| Juneau | 9.7 | 8.4 | 114.8 |
| Ketchikan | 18.7 | 18.4 | 101.9 |
| King Salmon | 3.0 | 2.3 | 131.2 |
| Kotzebue | 0.6 | 1.1 | 57.9 |
| McGrath | 3.3 | 1.5 | 226.0 |
| Nome | 1.7 | 1.8 | 92.9 |
| St. Paul Island | 5.4 | 3.3 | 162.7 |
| Talkeetna | 2.4 | 2.8 | 87.1 |
| Utqiagvik | 0.9 | 0.5 | 166.7 |
| Yakutat | 15.8 | 18.9 | 83.6 |

Table 2. Monthly precipitation sum, normal (1991-2020) and departure expressed as a percentage of the normal (1991-2020) for selected stations throughout the state, October 2021. Shades of purple and green correlate with Figure 4.

| Station | Snow (in) | Normal (in) | Deviation (%) | Snow Depth (in) |
|-----------|-----------|-------------|---------------|-----------------|
| Anchorage | 2.3 | 5.6 | 41.1 | 0 |
| Bettles | 20.4 | 12.0 | 170.0 | 11 |
| Fairbanks | 8.0 | 8.2 | 97.6 | Trace |
| Juneau | 0.0 | 0.9 | 0.0 | 0 |

Table 3. Monthly snowfall sum, normal (1991-2020), departure expressed as a percentage of the normal, and end-of-month snow depth for the selected stations that measure snowfall, October 2021.

Drought

For the third month in a row, the U.S. drought monitor did not show any drought conditions for the month of October across the state of Alaska. Figure 6 has been produced through a collaboration of the USDA, NOAA and the National Drought Mitigation Center.

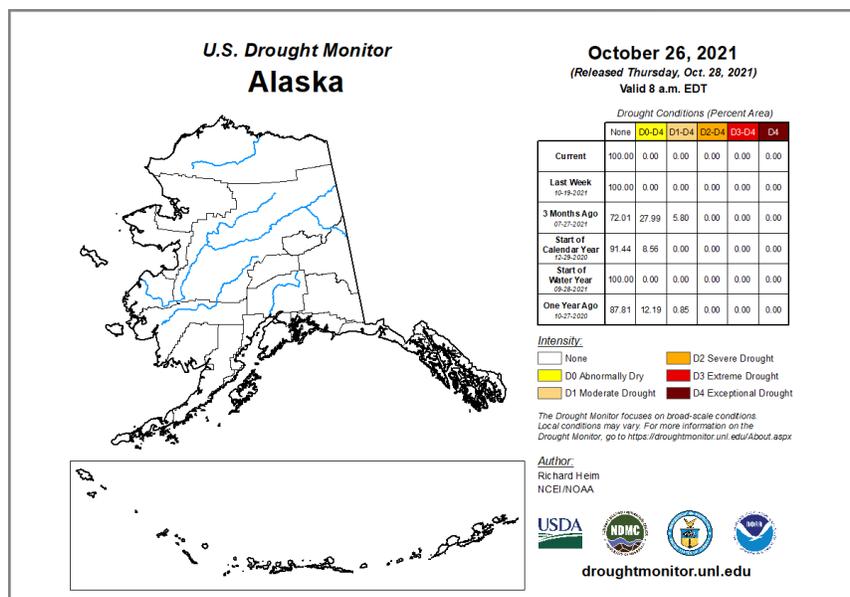


Figure 6: U.S. Drought Monitor map for Alaska, updated on October 26, 2021. The table on the right shows the percent area affected by different categories of drought intensity. Figures and data produced and released by the U.S. Drought Monitor, a partnership between the National Drought Mitigation Center at the University of Nebraska-Lincoln, the United States Department of Agriculture, and the National Oceanic and Atmospheric Administration (<https://droughtmonitor.unl.edu>).

Arctic Sea Ice

After the minimum extent was reached on September 16, sea ice extent began rapidly rising in the Beaufort and Chukchi Seas. The late retreat of sea ice in these areas kept ocean temperatures low, allowing sea ice to form quickly as temperatures dropped. Although the average sea ice extent for October 2021 was the 8th lowest in the 43-year satellite record, the extent at the end of the month was higher than any year since 2015. As of October 28, the sea ice has grown to 8.13 million square kilometers (Figure 7). Figures 8A,B show the sea ice extent and concentration as of October 31, 2021 compared with the average from 1981 – 2010.

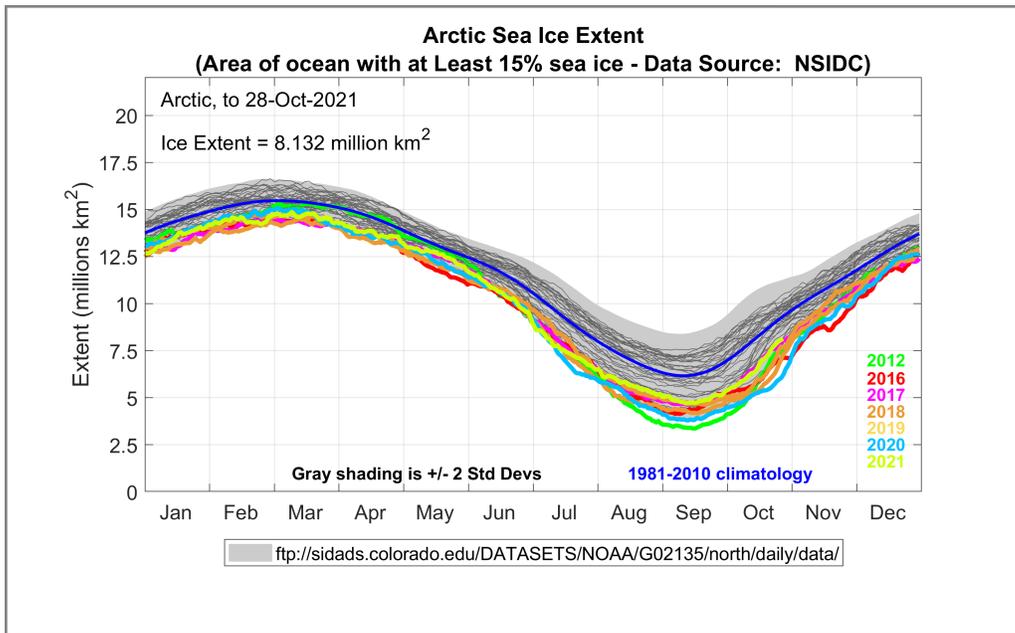


Figure 7. Time series of daily Arctic sea ice extent. This year’s data (lime green) are updated until October 28, 2021. The median sea ice extent for the 1981-2010 reference period is depicted in blue. Specific years are highlighted in colors. Plot Compiled by: Howard J. Diamond, PhD; Climate Science Program Manager at NOAA’s Air Resources Laboratory Data Source: National Snow & Ice Data Center (<https://nsidc.org/>).

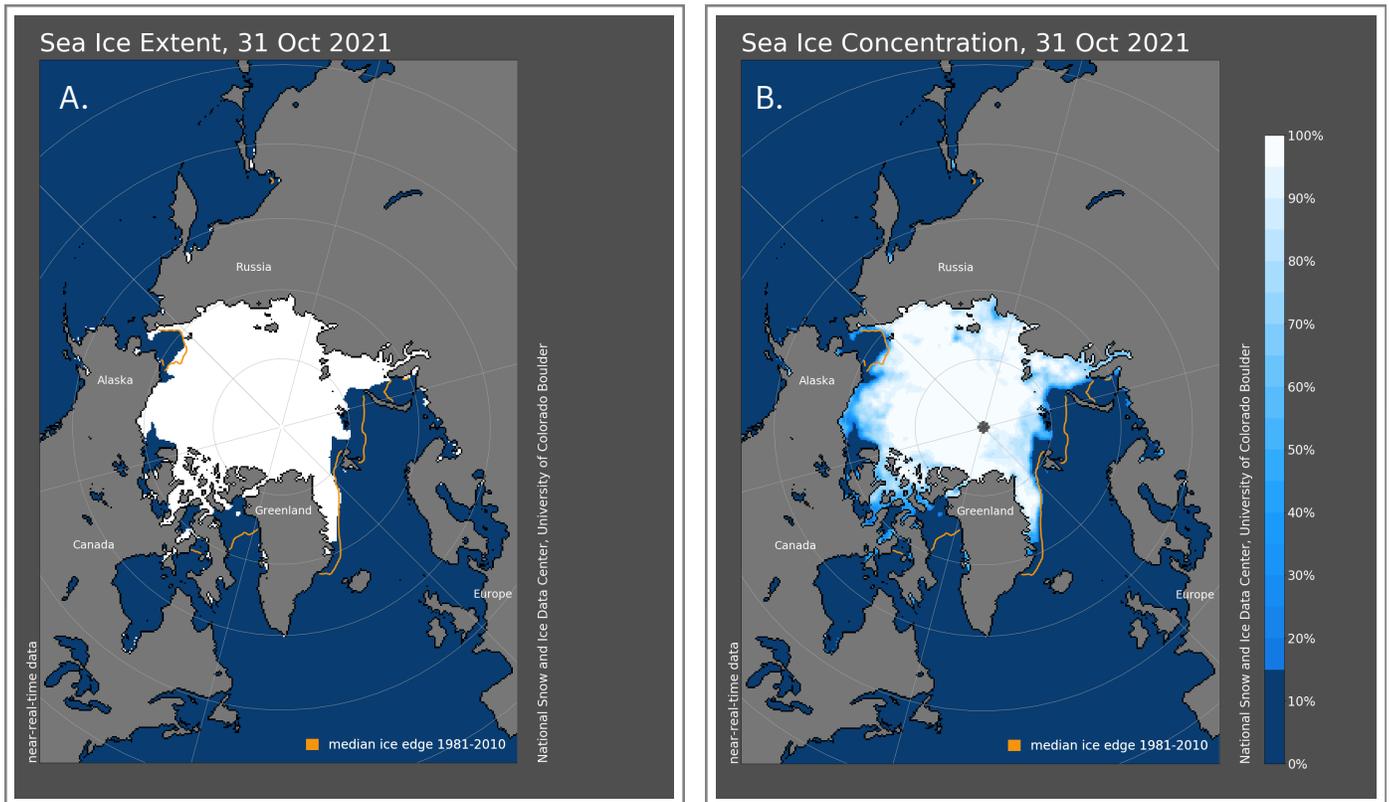


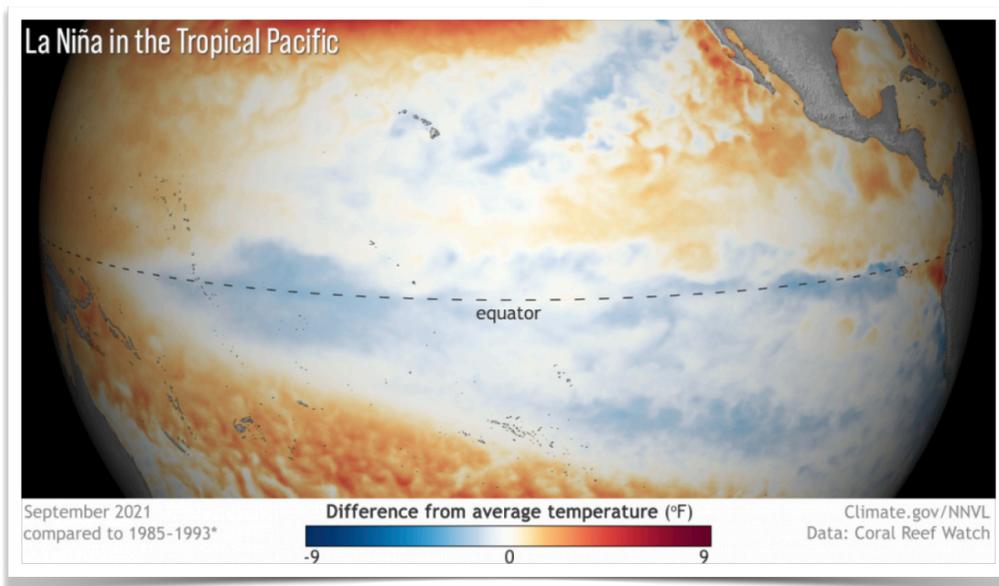
Figure 8. (A) Sea ice extent and (B) sea ice concentration as of October 31, 2021, and as compared with the 1981 - 2010 median edge. Images: National Snow and Ice Data Center (nsidc.org).

Newsworthy Information

At Alaska's most popular national park, climate change threatens the only road in and out

Halfway along the road park scientists have discovered that a rocky glacier lies underneath it. Warming temperatures are accelerating the glacier's movement downhill, carrying 300 feet of road bed with it.

<https://www.seattletimes.com/nation-world/at-alaskas-most-popular-national-park-climate-change-threatens-the-only-road-in-and-out/>



Double-dip La Nina emerges

A La Nina has developed and will extend through the second winter in a row according to NOAA's Climate Prediction Center.

<https://www.noaa.gov/news/double-dip-la-nina-emerges>

Appendix

Table A1: October 2021 daily records of maximum daily temperature, i.e. highest/lowest values of maximum daily temperature ever recorded on specific days. Records are computed since the beginning of the respective time series. One new highest maximum daily temperature record was set and one was set for lowest maximum daily temperature record.

| Highest Maximum Daily Temperature Record | | | | |
|--|------------|-----------------|--------------------|-----------------|
| Station | Date | New Record (°F) | Year of Old Record | Old Record (°F) |
| Homer | 2021-10-17 | 57.0 | 2013 | 54.0 |
| Fairbanks | 2021-10-30 | 48.0 | 1928 | 45.0 |

| Lowest Maximum Daily Temperature Record | | | | |
|---|------------|-----------------|--------------------|-----------------|
| Station | Date | New Record (°F) | Year of Old Record | Old Record (°F) |
| Ketchikan | 2021-10-07 | 47.0 | 1918 | 48.0 |

Table A2: October 2021 daily records of minimum daily temperature, i.e. highest/lowest values of minimum daily temperature ever recorded on specific days. Records are computed since the beginning of the respective time series. No new record for highest minimum daily temperature was set and one new record for lowest minimum daily temperature.

| Lowest Minimum Daily Temperature on Record | | | | |
|--|------------|-----------------|--------------------|-----------------|
| Station | Date | New Record (°F) | Year of Old Record | Old Record (°F) |
| King Salmon | 2021-10-04 | 15.0 | 1971 | 17.0 |

This information consists of climatological data compiled by the Alaska Climate Research Center, Geophysical Institute, University of Alaska Fairbanks. For more information on weather and climatology, visit the center website at <http://akclimate.org>. Please report any comments, ideas or errors to webmaster@akclimate.org.